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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/584,264	06/26/2006	Atsushi Ookouchi	292984US26PCT	5657

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P.  
1940 DUKE STREET  
ALEXANDRIA, VA 22314

EXAMINER
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EDWARDS, LAURA ESTELLE

ART UNIT	PAPER NUMBER
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1792

NOTIFICATION DATE	DELIVERY MODE
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12/31/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/584,264	<b>Applicant(s)</b> OOKOUCHI ET AL.	
	<b>Examiner</b> Laura Edwards	<b>Art Unit</b> 1792	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 August 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 26-50 is/are pending in the application.
- 4a) Of the above claim(s) 38-50 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :20061003; 20070919; 20080730; 20081015; 20090914.

***Election/Restrictions***

Applicant's election of Group I, claims 26-37 in the reply filed on 8/31/09 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

***35 USC § 112, Sixth Paragraph***

Acknowledgement is made of claim 29 which includes means plus function limitation which has been treated under 35 U.S.C. 112, sixth paragraph.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 26-28, 31, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun et al (US 6,191,053) in view of Kitano et al (US 6,416,583).

Chun provides for an apparatus for applying coating liquid to a spun substrate comprising a substrate holding unit (114) that holds a substrate in a horizontal attitude, the substrate receiving the coating liquid; a rotational drive mechanism (113) that rotates the substrate holding unit, holding the substrate, around a vertical axis; a liquid coating nozzle (30) that ejects a liquid coating solution toward the substrate, the nozzle having an ejection port having a shape of an elongated slit, the ejection port having a length, measured in a longitudinal direction thereof, smaller than a radius of the substrate; a moving mechanism (220) that moves the nozzle in a substantially radial direction of the substrate, the moving mechanism including a nozzle support unit (172) to support the nozzle; and a control unit or microcomputer (210/212) that controls the rotational drive mechanism and the moving mechanism, wherein the nozzle support unit of the moving mechanism is configured to support the nozzle such that a longitudinal direction of the ejection port is oriented parallel to a moving direction of the nozzle in which the nozzle moves in the radial direction of the substrate when the ejection port is located above the substrate; and wherein the control unit is configured to control the rotational drive mechanism and the moving mechanism so that the nozzle is moved from a peripheral portion of the substrate toward the center portion of the substrate while ejecting the solution in a form of a strip through the ejection port and while rotating the substrate around the vertical axis, thereby to supply the solution to a surface of the substrate in a spiral form. Even though Chun does not suggest that the nozzle can be used to supply other coating liquids such as developer, Chun does recognize that the substrate would be further subject to developing solution (col. 1, lines 29-41). Further, it was known in

Art Unit: 1792

the art at the time the invention was made to utilize a coating liquid nozzle if used for applying photoresist to be used to supply any desired coating liquid to the substrate being treated as evidenced by Kitano (col. 25, lines 1-6). In light of the teachings of Kitano, it would have been within the purview of one skilled in the art to utilize the Chun apparatus including its nozzle to supply any desired coating liquid including a developing solution to be applied to the substrate. The type of coating liquid would depend upon the product being produced by the apparatus.

With respect to claim 27, Chun alleges a finite width (w) of the nozzle so as to minimize coating waste and speed up the coating process (col. 12, lines 28-37) but does not set forth a specific nozzle width and length range. However, an appropriate dimension of the nozzle in accordance with the product being made so to minimize coating waste yet speed of the coating process would be determined via routine experimentation.

With respect to claim 28, even though Chun does not suggest a temperature control unit for the nozzle, it was known in the art at the time the invention was made to provide for a temperature control unit for (141) as taught by Kitano (col. 20, lines 8+) to heat the coating liquid to a prescribed/predetermined temperature to prevent interruption in coating application to the substrate as well one skilled in the art would utilize temperature control of the nozzle to facilitate control in viscosity or flow of the desired coating liquid. Thus, it would be well within the purview of one skilled in the art to provide a temperature control unit for the nozzle in the apparatus as defined by the combination above in order to prevent interruption in coating application to the substrate from the nozzle as well as facilitate control in viscosity or flow of the desired coating liquid onto the substrate.

Art Unit: 1792

With respect to claim 31, the apparatus as defined by the combination above would allow via use of the microcomputer to store preset parameters relating to coating/development of the substrate as well as enable temperature data relating to the coating liquids used to be stored and enable control of the temperature of the nozzle in accordance with all such data.

With respect to claim 37, the apparatus as defined by the combination above provides for a nozzle which moves from an outer periphery of the substrate and moves toward the center of the substrate to apply the spiral coating to the substrate (see Chun col. 3, lines 5-9).

Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun et al (US 6,191,053) in view of Kitano et al (US 6,416,583) as applied to claim 26 above, and further in view of Litvak (US 5,499,733).

The teachings of Chun and Kitano have been mentioned above but neither teach or suggest using plural nozzles with each selectively temperature controlled. However, it was known in the art at the time the invention was made to provide for plural nozzles with each selectively temperature controlled to supply a desired coating liquid of a desired temperature to a spin coated substrate as evidenced by Litvak (col. 6, lines 60-65). In light of the teachings of Litvak, it would have been obvious to one of ordinary skill in the art to provide for use of plural nozzles with each selectively independently temperature controlled in the apparatus as defined by the combination above in order to control the supply/flow/temperature of coating liquids applied to the substrate.

With respect to claim 30, this claim has been read as a process limitation and thus adds no further structural detail to the apparatus.

Art Unit: 1792

Claims 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chun et al (US 6,191,053) in view of Kitano et al (US 6,416,583) and Litvak (US 5,499,733) as applied to claim 29 above, and further in view of Kitano et al (US 2002/0000193).

The teachings of Chun, Kitano, and Litvak have been mentioned above but neither teach or suggest using with the temperature controlled nozzles, a concentration control unit for controlling concentration of a selected coating solution to be applied to the substrate. However, it was known in the art at the time the invention was made to provide for a coating liquid concentration control unit in communication with a coating solution supply nozzle in order to apply the coating solution at a desired concentration and viscosity onto the substrate as evidenced by Kitano '193 [0061-0062]. In light of the teachings of Kitano '193, it would have been within the purview of one skilled in the art to utilize a coating liquid concentration control unit in communication with each coating solution supply nozzle in the apparatus as defined by the combination above in order to apply the coating solution at a desired concentration and viscosity onto the substrate.

With respect to claim 33, this claim has been read as a process limitation and thus adds no further structural detail to the apparatus.

With respect to claim 34, the apparatus as defined by the combination above would allow via use of the microcomputer to store preset parameters relating to temperature and coating liquid concentration as well as enable temperature/concentration data relating to the coating liquids used to be stored and enable control of the temperature/concentration of each nozzle in accordance with all such data.



Art Unit: 1792

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chun et al (US 6,191,053) in view of Kitano et al (US 6,416,583) as applied to claim 26 above, and further in view of Hood et al (US 3,953,265).

The teachings of Chun and Kitano have been mentioned above but neither teach or suggest the use of a surface treatment liquid nozzle that supplies a surface treatment liquid to the surface to enhance wettability of the substrate surface. However, it was known in the art at the time the invention was made, to provide a surface treatment liquid nozzle that supplies a surface treatment liquid to the surface to a substrate to enhance wettability of the coating liquid on substrate as well as provide for a meniscus body over the surface of the substrate without overflow as evidenced by Hood (col. 5, lines 43-48). It would have been obvious to one of ordinary skill in the art to provide a surface treatment liquid nozzle as taught by Hood in the apparatus as defined by the combination above in order to treat the substrate to enhance wettability of the coating liquid on substrate as well as provide for a meniscus body over the surface of the substrate without overflow.

Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chun et al (US 6,191,053) in view of Kitano et al (US 6,416,583) as applied to claim 26 above, and further in view of Sanada et al (US 6,656,277).

The teachings of Chun and Kitano have been mentioned above but neither teach or suggest the use of a rinse nozzle and surfactant nozzle. However, it was known in the art at the time the invention was made, to provide at least a rinse nozzle in a coating application apparatus especially when applying developer solution as well as use surfactant to accelerate the

Art Unit: 1792

developing process on the substrate as evidenced by Sanada (col. 5, lines 1-9 and col. 8, lines 37-53). It would have been obvious to one of ordinary skill in the art to provide at least a rinse nozzle as taught by Sanada to the apparatus as defined by the combination above in order to treat/rinse the coated substrate. Also, in light of the teachings that a developer can be provided alone for application to a substrate and a surfactant can be added to accelerate development on the substrate, it also would have been within the purview of one skilled in the art to provide a surfactant nozzle in the apparatus as defined by the combination above in order to supply surfactant post developing application on a substrate in order to accelerate development of the coated substrate.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura Edwards whose telephone number is (571) 272-1227. The examiner can normally be reached on Monday-Wednesday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1792

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura Edwards/  
Primary Examiner  
Art Unit 1792

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December 20, 2009